CLAIMS

What is claimed is:

1. An image transform method, comprising:

    (a) first filtering an input two-dimensional real-valued digital image with respect to a first dimension, said first filtering including a first lowpass filtering to yield a lowband and a first highpass filtering to yield a highband;

    (b) second filtering said lowband from step (a) with respect to a second dimension, said second filtering including a second lowpass filtering to yield a low-lowband and a second highpass filtering to yield a high-lowband; and

    (c) third filtering said highband from step (a) with respect to said second dimension, said third filtering including a third lowpass filtering to yield a low-highband, a third highpass filtering to yield a first high-highband, and a fourth highpass filtering to yield a second high-highband, wherein said third and fourth highpass filterings have impulse response z-transforms as complex conjugates.

2. The method of claim 1, wherein:

    (a) said first filtering is polyphase with 3 phases.

3. The method of claim 2, wherein:

    (a) said second and third filterings are each polyphase with 3 phases.

4. The method of claim 1, wherein:

    (a) said first lowpass filter has a passband approximating the frequency range $[-\pi/3, \pi/3]$ and said first highpass filter has a passband approximating the frequency range $[\pi/3, \pi]$; and

    (b) prior to said second filtering, downsampling said lowband by a factor of 3 with respect to said first dimension.

5. The method of claim 4, wherein:

     (a) after said second filtering, downsampling each of said low-lowband and said high-lowband by a factor of 3 with respect to said second dimension.

6. The method of claim 1, wherein:

     (a) prior to said third filtering, downsampling said highband by a factor of 3 with respect to said first dimension.

7. The method of claim 6, wherein:

     (a) after said third filtering, downsampling each of said low-highband, said first high-highband, and said second high-highband by a factor of 3 with respect to said second dimension.

8. The method of claim 1, wherein:

     (a) said first lowpass and first highpass filterings corresponds to a real scaling function and a complex wavelet, respectively.

9. The method of claim 1, further comprising:

     (a) repeating steps (a)-(c) of claim 1 for an input derived from said low-lowband.

10. A non-redundant, complex-wavelet transformer for two-dimensional images, comprising:

     (a) a first one-dimensional polyphase filter bank for input real-valued, two-dimensional digital images, said first filter bank with three phase filters and a lowpass output and a positive-frequency highpass output;

     (b) a second one-dimensional polyphase filter bank coupled to the lowpass output of said first filter bank, said second filter bank with three phase filters and a lowpass output and a positive-frequency highpass output; and

     (c) a third one-dimensional polyphase filter bank coupled to the highpass output of said first filter bank, said third filter bank with three phase filters and a lowpass output, a positive-frequency highpass output, and a negative-frequency highpass output.

11. The transformer of claim 10, wherein:

(a) said first, second, and third filter banks are implemented as programs on a programmable processor.

12. A digital camera, comprising:

(a) a sensor;

(b) an image pipeline coupled to said sensor, said image pipeline including an image compressor with

(i) a first one-dimensional polyphase filter bank for input real-valued, two-dimensional digital images, said first filter bank with three phase filters and a lowpass output and a positive-frequency highpass output;

(ii) a second one-dimensional polyphase filter bank coupled to the lowpass output of said first filter bank, said second filter bank with three phase filters and a lowpass output and a positive-frequency highpass output; and

(iii) a third one-dimensional polyphase filter bank coupled to the highpass output of said first filter bank, said third filter bank with three phase filters and a lowpass output, a positive-frequency highpass output, and a negative-frequency highpass output.

13. The camera of claim 12, wherein:

(a) said first, second, and third filter banks are implemented as programs on a programmable processor.